TRICHAPTER UNIFORM CODES PROGRAM
2002 CBC AMENDMENTMENTS AND INTERPRETATION

Proposed by Code Interpretation Committee:

Date: March 1, 2002

Item Number: 1
Code Section: 1629.4.2
Proposed Amendment (strikeout/underline format):

1629.4.2. Seismic Zone 4 near-source factor. In Seismic Zone 4, each site shall be assigned a near-source factor in accordance with Table 16-S and the Seismic Source Type set forth in Table 16-U. The value of N_a used in determining C_a need not exceed 1.1 for structures complying with all the following conditions:

1. The soil profile type is S_A, S_B, S_C or S_D.

2. $\rho = 1.0$.

3. Except in single-story structures, Group R, Division 3 and Group U, Division 1 Occupancies, moment frame systems designated as part of the lateral-force-resisting system shall be special moment-resisting frames.

4. The provisions in ~~exceptions to Section 2213.7.5~~ Sections 9.6a and 9.6b of AISC - Seismic Part 1 shall not apply, except for columns in one-story buildings or columns at the top story of multistory buildings.

5. None of the following structural irregularities is present: Type 1, 4 or 5 of Table 16-L, and Type 1 or 4 of Table 16-M.

Recommendation: Approve

Reason for amendment:

Sections 9.6a and 9.6b of AISC - Seismic Part 1 exempts strong-column/weak-beam requirements under certain load conditions and configurations for steel Special and Intermediate moment frames. 97 UBC Section 1629.4.2 item 4 require that structures located near fault shall comply with SC/WB. The revision reflects the same requirements as in 1997 AISC-Seismic. This is consistent with SEAOC Seismology position.

Findings (based upon local geologic, topographic or climatic conditions):

The amendment is needed due to local geological conditions.

The San Francisco Bay area region is densely populated and/or located in an area of high seismic activities as indicated by United States Geological Survey and California Division of Mines and Geology. Recent earthquake activities, including the 1989 Loma Prieta earthquake, have indicated the lack of adequate design and detailing as a contributing factor to damages that reduced the protection of the life-safety of building occupants.

Recommendations:

Use as Amendment

TRICHAPTER UNIFORM CODES PROGRAM
2002 CBC AMENDMENTMENTS AND INTERPRETATION

Proposed by Code Interpretation Committee:
Date: March 1, 2002
Item 2.

Table 16-N of the California Building Code is amended to read as follows:

TABLE 16-N – STRUCTURAL SYSTEMS [1]

BASIC STRUCTURAL SYSTEM[2]	LATERAL-FORCE-RESISTING SYSTEM DESCRIPTION	*R*	Ω	*HEIGHT LIMIT FOR SEISMIC ZONES 3 AND 4 (feet)* x 304.8 for mm
1. Bearing wall system	*1. Light-framed walls with shear panels*			
	a. Wood structural panel walls for structures three stories or less	*5.5*	*2.8*	*65*
	b. All other light-framed walls	*4.5*	*2.8*	*65*
	2. Shear walls			
	a. Concrete	*4.5*	*2.8*	*160*
	b. Masonry	*4.5*	*2.8*	*160*
	3. Light steel-framed bearing walls with tension-only bracing	*2.8*	*2.2*	*65*
	4. Braced frames where bracing carries gravity load			
	a. Steel			
	b. Concrete[3]	*4.4*	*2.2*	*160*
	c. Heavy timber	*2.8*	*2.2*	*- [3]*
		2.8	*2.2*	*65*
2. Building frame system	*1. Steel eccentrically braced frame (EBF)*	*7.0*	*2.8*	*240*
	2. Light-framed walls with shear panels.			
	a. Wood structural panel walls for structures three stories or less	*6.5*	*2.8*	*65*
	b. All other light-framed walls	*5.0*	*2.8*	*65*
	3. Shear walls			
	a. Concrete	*5.5*	*2.8*	*240*
	b. Masonry	*5.5*	*2.8*	*160*
	4. Ordinary braced frames			
	a. Steel [6]	*5.6*	*2.2*	*35[6] ~~160~~*
	b. Concrete[3]	*5.6*	*2.2*	*- [3]*
	c. Heavy timber	*5.6*	*2.2*	*65*
	5. Special concentrically braced frames			
	a. Steel	*6.4*	*2.2*	*240*
3. Moment-resisting frame system	*1. Special moment-resisting frame (SMRF)*			
	a. Steel	*8.5*	*2.8*	*N.L.*
	b. Concrete[4]	*8.5*	*2.8*	*N.L.*
	2. Masonry moment-resisting wall frame (MMRWF)	*6.5*	*2.8*	*160*
	3. ~~Concrete i~~ Intermediate moment-resisting frame (IMRF)[5]			
	a. Steel[6]	*4.5*	*2.8*	*35[6]*
	b. Concrete[5]	*5.5*	*2.8*	*- [3]*
	4. Ordinary moment-resisting frame (OMRF)			
	a. Steel [6]	*3.5*	*2.8*	*35[6] ~~160~~*
	b. Concrete[8]	*3.5*	*2.8*	*- [3]*
	5. Special truss moment frames of steel (STMF)	*6.5*	*2.8*	*240*

4. Dual systems	*1. Shear walls*			
	a. Concrete with SMRF	8.5	2.8	N.L.
	b. Concrete with steel OMRF (Not Permitted)	~~4.2~~	~~2.8~~	~~160~~
	c. Concrete with concrete IMRF [5]	6.5	2.8	~~160~~ - [5]
	d. Masonry with SMRF	5.5	2.8	160
	e. Masonry with steel OMRF *(Not Permitted)*	~~4.2~~	~~2.8~~	~~160~~
	f. Masonry with concrete IMRF [3]	4.2	2.8	- [3]
	g. Masonry with masonry MMRWF	6.0	2.8	160
	2. Steel EBF			
	a. With steel SMRF	8.5	2.8	N.L.
	b. With steel OMRF *(Not Permitted)*	~~4.2~~	~~2.8~~	~~160~~
	3. Ordinary braced frames *(Not Permitted)*			
	~~a. Steel with steel SMRF~~	~~6.5~~	~~2.8~~	~~N.L.~~
	~~b. Steel with steel OMRF~~	~~4.2~~	~~2.8~~	~~160~~
	~~c. Concrete with concrete SMRF[3]~~	~~6.5~~	~~2.8~~	- [3]
	~~d. Concrete with concrete IMRF[3]~~	~~4.2~~	~~2.8~~	- [3]
	4. Special concentrically braced frames			
	a. Steel with steel SMRF	7.5	2.8	N.L.
	b. Steel with steel OMRF *(Not Permitted)*	~~4.2~~	~~2.8~~	~~160~~
	5. Steel IMRF *(Not permitted)*			
5. Cantilevered column building systems	1. Cantilevered column elements	2.2	2.0	35[7]
6. Shear wall-frame interaction systems	1. Concrete[8]	5.5	2.8	160
7. Undefined systems	See Section 1629.6.7 and 1629.9.2	-	-	-

N.L.– no limit

[1] See Section 1630.4 for combination of structural systems.
[2] Basic structural systems are defined in Section 1629.6.
[3] Prohibited in Seismic Zones 3 and 4.
[4] Includes precast concrete conforming to Section 1921.2.7.
[5] Prohibited in Seismic Zones 3 and 4, except as permitted in Section 1634.2.
[6] In Seismic Zones 3 and 4 steel IMRF's, OMRF's and steel ordinary braced frames are permitted as follows:

6.1 ~~Where the near source factor N equals one, structures~~ Structures using Steel IMRF's and OMRF's are permitted to a height of 35 ft. where the total dead weight of the floors, walls and roof do not exceed *35* psf. or for single-story buildings where the moment joints of field connections are constructed of bolted end plates and the dead load of the roof does not exceed 15 psf. the height is permitted to be increased to 60 ft.

6.2 ~~Where the near source factor N is greater than one, structures~~ Steel ordinary braced frames are permitted ~~to a~~ in penthouse structures and in other one-story buildings or structures ~~height of 35 feet~~ where the total dead weight of the ~~floors, walls and~~ roof does not exceed 15 psf, and the height of the building or structure does not exceed 60 feet.

[7] Total height of the building including cantilevered columns.
[8] Prohibited in Seismic Zones 2A, 2B, 3 and 4. See Section 1633.2.7.

(Note: NEHRP TS6 to study raising the 15 psf dead weight limit for Steel IMRF and OMRF.)

Recommendation: Approve as Modified

Reason for amendment:

The proposal allows the use of Ordinary Moment Frames and Intermediate Moment frames with certain limitations on height and dead load.

Editorially revise/update table to make it consistent with the adoption of 1997 AISC-Seismic Provisions and the latest Supplements. These provisions are fundamentally updated from previous editions. It has incorporated to the extent possible, most recent findings from the FEMA funded SAC Reports.

Findings (based upon local geologic, topographic or climatic conditions):

The amendment is needed due to local geological conditions.

The San Francisco Bay area region is densely populated and/or located in an area of high seismic activities as indicated by United States Geological Survey and California Division of Mines and Geology. Recent earthquake activities, including the 1989 Loma Prieta earthquake, have indicated the lack of adequate design and detailing as a contributing factor to damages that reduced the protection of the life-safety of building occupants.

Recommendations:

Use as Amendment

Proposed by Code Interpretation Committee:

Date: March 1, 2002

Item Number: 3
Code Section: 2204
Proposed Amendment (strikeout/underline format):

SECTION 2204-DESIGN METHODS

Design shall be by one of the following methods.

2204.1 Load and Resistance Factor Design. Steel design based on load and resistance factor design method shall resist the factored load combinations of section 1612.2 in accordance with the applicable requirements of section 2205. ~~Seismic design of structures, where required, shall comply with Division IV for structures design in accordance with Division II (LRFD)~~

2204.2 Allowable Stress Design. Steel design based on allowable stress design methods shall resist the factored load combinations of section 1612.3 in accordance with the applicable requirements of section 2205. ~~Seismic design of structures, where required, shall comply with Division V for structures designed in accordance with Division III (ASD)~~

Recommendation: Approve

Reason for amendment:

Editorially revise/update table to make it consistent with the adoption of 1997 AISC-Seismic Provisions and the latest Supplements. These provisions are fundamentally updated from previous editions. It has incorporated to the extent possible, most recent findings from the FEMA funded SAC Reports.

Findings (based upon local geologic, topographic or climatic conditions):

The amendment is needed due to local geological conditions.

The San Francisco Bay area region is densely populated and/or located in an area of high seismic activities as indicated by United States Geological Survey and California Division of Mines and Geology. Recent earthquake activities, including the 1989 Loma Prieta earthquake, have indicated the lack of adequate design and detailing as a contributing factor to damages that reduced the protection of the life-safety of building occupants.

Recommendations:

Use as Amendment

TRICHAPTER UNIFORM CODES PROGRAM
2002 CBC AMENDMENTMENTS AND INTERPRETATION

Proposed by Code Interpretation Committee:
Date: March 1, 2002
Item Number: 4
Code Section: 2210 & 2211
Proposed Amendment (strikeout/underline and Delete/Add format):

2205.3 Seismic Design Provisions for Structural Steel. Steel structural elements that resist seismic forces shall, in addition to the requirements of Section 2205.2 be designed in accordance with Division IV ~~or V~~.

SECTION x15. Divisions IV and V of Chapter 22 of the California Building Code are deleted in their entirety.

SECTON x16. Division IV of Chapter 22 of the California Building Code is added to read as follows:

Division IV — SEISMIC PROVISIONS FOR STRUCTURAL STEEL BUILDINGS

Based on Seismic Provisions for Structural Steel Buildings, of the American Institute of Steel Construction. Parts I and III, dated April 15, 1997 and Supplement No. 2, dated November 10, 2000.

Delete existing section 2210 and replace with following:

2210 — ADOPTION

Except for the modifications as set forth in Sections 2211 and 2212 of this division and the requirements of the Building Code, the seismic design, fabrication, and erection of structural steel shall be in accordance with the *Seismic Provisions for Structural Steel Buildings*, April 15, 1997 published by the American Institute of Steel Construction, 1 East Wacker Drive, Suite 3100, Chicago, IL 60601, as if set out at length herein. The adoption of *Seismic Provisions for Structural Steel Buildings* in this Division, hereinafter referred to as AISC-Seismic, shall include Parts I (LRFD), and III (ASD)~~.~~ and Supplement No. 2, dated November 10, 2000.

Where other codes, standards, or specifications are referred to in this specification, they are to be considered as only an indication of an acceptable method or material that can be used with the approval of the Building Official.

Delete existing paragraph in section 2211 and replace with following

2211 – DESIGN METHODS

When the load combinations from Section 1612.2 for LRFD are used, structural steel buildings shall be designed in accordance with Chapter 22 Division II (AISC-LRFD) and Part I of AISC-Seismic as modified by this Division.
When the load combinations from Section 1612.3 for ASD are used, structural steel buildings shall be designed in accordance with Chapter 22 Division III (AISC-ASD) and Part III of AISC-Seismic as modified by this Division.

Remove the existing section 2212 and replace with the following:

SECTION 2212 - AMENDMENTS

The AISC-Seismic adopted by this Division apply to the seismic design of structural steel members except as modified by this Section.

The following terms that appear in AISC-Seismic shall be taken as indicated in the 1997 Uniform Building Code.

AISC-Seismic	**1997 Uniform Building Code**
Seismic Force Resisting System	Lateral Force Resisting System
Design Earthquake	Design Basis Ground Motion
Load Combinations Eqs. (4-1) and (4-2)	Chapter 16 Eqs. (12-17) and (12-18) respectively
LRFD Specification Section Eqs. (A4-1) through (A4-6)	Chapter 16 Eqs. (12-1) through (12-6) respectively
$\varsigma_o Q_E$	E_m

1. Part I, Sec. 1. of the AISC Seismic Provisions is revised as follows:

1. SCOPE

These provisions are intended for the design and construction of structural steel members and connections in the Seismic Force Resisting Systems in buildings for which the design forces resulting from earthquake motions have been determined on the basis of various levels of energy dissipation in the inelastic range of response. These provisions shall apply to buildings in Seismic Zone 2 with an importance factor I greater than one, in Seismic Zone 3 and 4 or when required by the Engineer of Record.

These provisions shall be applied in conjunction with, Chapter 22, Division II, hereinafter referred to as the LRFD Specification. All members and connections in the Lateral Force Resisting System shall have a design strength as provided in the LRFD Specification to resist load combinations 12-1 through 12-6 (in Chapter 16) and shall meet the requirements in these provisions.

Part I includes a Glossary, which is specifically applicable to this Part, and Appendix S.

2. Part I, Sec. 4.1., first paragraph of the AISC Seismic Provisions is revised as follows:

4.1 Loads and Load Combinations

The loads and load combinations shall be those in ~~LRFD Specification Section A4.1~~ Section 1612.2 except as modified throughout these provisions.

Recommendation: Approve

Reason for amendment:

The current 97 UBC edition is based on the outdated 1992 AISC Seismic provisions. The proposal makes the CBC provisions consistent with the current practice which is based on the 1997 AISC Seismic with the 2 subsequent Supplements printed afterward.

Findings (based upon local geologic, topographic or climatic conditions):

The amendment is needed due to local geological conditions.

The San Francisco Bay area region is densely populated and/or located in an area of high seismic activities as indicated by United States Geological Survey and California Division of Mines and Geology. Recent earthquake activities, including the 1989 Loma Prieta earthquake, have indicated the lack of adequate design and detailing as a contributing factor to damages that reduced the protection of the life-safety of building occupants.

Recommendations:

Use as Amendment

Proposed by Code Interpretation Committee:

Date: March 1, 2002
Item No.: 5
Code Section: 1612.2.1

1612.2.1 Basic load combinations. Where Load and Resistance Factor Design (Strength Design) is used, structures and all portions thereof shall resist the most critical effects from the following combinations of factored loads:

1.*4D*	(12-1)
1.*2D* + 1.6*L* + 0.5 *(*L_r or *S*)	(12-2)
1.*2D* + 1.6 *(*L_r or S) + *(*f_1 *L* or 0.8 *W*)	(12-3)
1.*2D* + 1.*3W* + *(*f_1 *L* + 0.5 *(*L_r or *S*)	(12-4)
1.*2D* + 1.0*E* + *(*f_1 *L* + f_2 *S*)	(12-5)
~~0.*9D* ± (1.*0E* or 1.*3W*)~~	~~(12-6)~~
0.*9D* ± (1.0ρE_h or 1.*3W*)	(12-6)

WHERE:
f_1 = 1.0 for floors in places of public assembly, for live loads in excess of 100 psf (4.9 kN/m^2), and for garage live load.
= 0.5 for other live loads.
f_2 = 0.7 for roof configurations (such as saw tooth) that do not shed snow off the structure.
= 0.2 for other roof configurations.
EXCEPTIONS: 1. Factored load combinations for concrete per Section 1909.2 where load combinations do not include seismic forces.
2. ~~Factored load combinations of this section multiplied by 1.1 for concrete and masonry where load combinations include seismic forces.~~
~~3.~~ Where other factored load combinations are specifically required by the provisions of this code.

Recommendation: Approve

Reason for amendment:

a. To avoid reduction of the vertical seismic component (E_v) by 0.9D which was not the intent of considering the vertical component in seismic calculations.

b. To delete exception item 2 regarding the1.1 factor for concrete and masonry. The need for eliminating this factor has been well documented in many engineering and trade journal as wee as in SEAOC Blue Book Commentary C101.7.1 (page. 85)

Findings (based upon local geologic, topographic or climatic conditions):

The amendment is needed due to local geological conditions.

The San Francisco Bay area region is densely populated and/or located in an area of high seismic activities as indicated by United States Geological Survey and California Division of Mines and Geology. Recent earthquake activities, including the 1989 Loma Prieta earthquake, have indicated the lack of adequate design and detailing as a contributing factor to damages that reduced the protection of the life-safety of building occupants.

Recommendations:

Use as Amendment

TRICHAPTER UNIFORM CODES PROGRAM
2002 CBC AMENDMENTMENTS AND INTERPRETATION

Proposed by Code Interpretation Committee:

Date: March 1, 2002
Item No.: 6
Code Section: 1612.3.1

1612.3.1 Basic load combinations. Where allowable stress design (working stress design) is used, structures and all portions thereof shall resist the most critical effects resulting from the following combinations of loads:

D	(12-7)
$D + L + (L_r$ or $S)$	(12-8)
$D + (W$ or $E/1.4)$	(12-9)
$0.9D \pm E/1.4$	(12-10)
$D + 0.75 [L + (L_r$ or S) + (W or $E/1.4)]$	(12-11)

No increase in allowable stresses shall be used with these load combinations except as specifically permitted elsewhere in this code ~~.~~ and the duration of load increase permitted in Division III of Chapter 23.

Recommendation: Approve

Reason for amendment:

Allow consideration of duration of Load increase as explained in SEAOC Blue Book Commentary C101.7.3.1 and to be consistent with Ch 23. This is consistent with SEAOC Seismology position.

Findings (based upon local geologic, topographic or climatic conditions):

The amendment is needed due to local geological conditions.

The San Francisco Bay area region is densely populated and/or located in an area of high seismic activities as indicated by United States Geological Survey and California Division of Mines and Geology. Recent earthquake activities, including the 1989 Loma Prieta earthquake, have indicated the lack of adequate design and detailing as a contributing factor to damages that reduced the protection of the life-safety of building occupants.

Recommendations:

Use as Amendment

Proposed by Code Interpretation Committee:

Date: March 1, 2002

Item Number: 7
Code Section: 1612.3.2
Proposed Amendment (strikeout/underline format):

1612.3.2 Alternate basic load combinations. In lieu of the basic load combinations specified in Section 1612.3.1, structures and portions thereof shall be permitted to be designed for the most critical effects resulting from the following load combinations. When using these alternate basic load combinations, a one-third increase shall be permitted in allowable stresses for all combinations including *W* or *E*. ~~—~~but not concurrent with the duration of load increase permitted in Division III of Chapter 23.

$D + L + (L_r$ or S)	(12-12)
$D + L + (W$ or $E/1.4)$	(12-13)
$D + L + W + S/2$	(12-14)
$D + L + S + W/2$	(12-15)
$D + L + S + E/1.4$	(12-16)
$0.9D \pm E/1.4$	(12-16-1)

EXCEPTIONS: 1. Crane hook loads need not be combined with roof live load or with more than three fourths of the snow load or one half of the wind load.
2. Design snow loads of 30 psf (1.44 kN/m 2) or less need not be combined with seismic loads. Where design snow loads exceed 30 psf (1.44 kN/m 2), the design snow load shall be included with seismic loads, but may be reduced up to 75 percent where consideration of siting, configuration and load duration warrant when approved by the building official.

Recommendation: Approve

The proposal clarifies that it was not the intent of the code to allow the one-third increase for wind or earthquake to be cumulative with duration of load factors as permitted in chapter 23 of UBC, since these factors essentially represent the same allowance.

Reason for amendment:

Findings (based upon local geologic, topographic or climatic conditions):

The amendment is needed due to local geological conditions.

The San Francisco Bay area region is densely populated and/or located in an area of high seismic activities as indicated by United States Geological Survey and California Division of Mines and Geology. Recent earthquake activities, including the 1989 Loma Prieta earthquake, have indicated the lack of adequate design and detailing as a contributing factor to damages that reduced the protection of the life-safety of building occupants.

Recommendations:

Use as Amendment

Proposed by Code Interpretation Committee:

Date: March 1, 2002

Item Number: 8
Code Section: 1630.2.3.4
Proposed Amendment (strikeout/underline format):

1630.2.3.4 Horizontal Distribution. Diaphragms constructed of untopped steel decking or wood structural panels or similar light-frame construction are permitted to be considered as flexible.

SECTION x7. Section 1630.2.3 of the California Building Code is amended by adding Section 1630.2.3.5 to read as follows:

~~**1630.2.3.4**~~ **1630.2.3.5 Applicability.** Sections 1630.1.2, 1630.1.3, 1630.2.1, 1630.2.2, 1630.5, 1630.9, 1630.10 and 1631 shall not apply when using the simplified procedure.

EXCEPTION: For buildings with relatively flexible structural systems, the building official may require consideration of $P\Delta$ effects and drift in accordance with Sections 1630.1.3, 1630.9 and 1630.10. Δ_s shall be prepared using design seismic forces from Section 1630.2.3.2.

Recommendation: Approve

Reason for amendment:

The proposal is compatible with the current policy adopted by the Tri-Chapter jurisdictions. The assumption of flexible diaphragm is limited only to simplified procedure which requires design for additional seismic loads.

Findings (based upon local geologic, topographic or climatic conditions):

The amendment is needed due to local geological conditions.

The San Francisco Bay area region is densely populated and/or located in an area of high seismic activities as indicated by United States Geological Survey and California Division of Mines and Geology. Recent earthquake activities, including the 1989 Loma Prieta earthquake, have indicated the lack of adequate design and detailing as a contributing factor to damages that reduced the protection of the life-safety of building occupants.

Recommendations:

Use as Amendment

Proposed by Code Interpretation Committee:

Date: March 1, 2002

Item Number: 9
Code Section: 1630.4.2
Proposed Amendment (strikeout/underline format):

1630.4.2 Vertical combinations. The value of *R* used in the design of any story shall be less than or equal to the value of *R* used in the given direction for the story above.

> **EXCEPTION:** This requirement need not be applied to a story where the dead weight above that story is less than 10 percent of the total dead weight of the structure.

Structures may be designed using the procedures of this section under the following conditions:
1. The entire structure is designed using the lowest *R* of the lateral-force-resisting systems used, or
2. The following two-stage static analysis procedures may be used for structures conforming to Section 1629.8.3, Item 4.

2.1 The flexible upper portion shall be designed as a separate structure, supported laterally by the rigid lower portion, using the appropriate values of *R* and ρ.

2.2 The rigid lower portion shall be designed as a separate structure using the appropriate values of *R* and ρ. The reactions from the upper portion shall be those determined from the analysis of the upper portion ~~amplified~~ multiplied by the ratio of the *(R/*ρ) of the upper portion over *(R/ρ*) of the lower portion. This ratio shall not be taken less than 1.0.

Recommendation: Approved

Reason for amendment:

The proposal adds language to ensure that the seismic forces are not inadvertently reduced from a higher level to a lower level due to different lateral force resisting systems along the height of the building

Findings (based upon local geologic, topographic or climatic conditions):

The amendment is needed due to local geological conditions.

The San Francisco Bay area region is densely populated and/or located in an area of high seismic activities as indicated by United States Geological Survey and California Division of Mines and Geology. Recent earthquake activities, including the 1989 Loma Prieta earthquake, have indicated the lack of adequate design and detailing as a contributing factor to damages that reduced the protection of the life-safety of building occupants.

Recommendations:

Use as Amendment

Proposed by Code Interpretation Committee:

Date: March 1, 2002

Item Number: 10
Code Section: 1630.7
Proposed Amendment (strikeout/underline format):

1630.7 Horizontal Torsional Moments. Provisions shall be made for the increased shears resulting from horizontal torsion where diaphragms are not flexible. The most severe load combination for each element shall be considered for design.

The torsional design moment at a given story shall be the moment resulting from eccentricities between applied design lateral forces at levels above that story and the vertical-resisting elements in that story plus an accidental torsion.

The accidental torsional moment shall be determined by assuming the mass is displaced as required by Section 1630.6.

Where torsional irregularity exists, as defined in Table 16-M, the effects shall be accounted for by increasing the accidental torsion at each level by an amplification factor, A_x , determined from the following formula:

$$A_x = \left[\frac{\delta_{\max}}{1.2\delta_{avg}} \right]^2 \qquad (30\text{-}16)$$

WHERE:

δ_{avg} = the average of the ~~displacements~~ story drift at the extreme points of the structure at Level *x*.

δ_{max} = the maximum displacement story drift at Level *x*.

The value of A_x need not exceed 3.0.

~~**Exceptions:** 1. The value of A_x need not exceed 3.0.~~
~~2. The torsional and accidental torsional moment need not be amplified for structures of light-frame construction, nor for structures designed using Section 1630.2.3.~~

Recommendation: Approve as Modified

Reason for amendment:

The approved language replaces the word "displacement" with "drift", which is more appropriate when considering amplification of the diaphragm torsional effects.

The latter part of the original proposal which would have exempted the diaphragms in light-frame construction altogether from torsional amplification, was not approved by the committee. The committee believes that another amendment (item 12) dealt with this issue by allowing such diaphragms to be considered flexible in most situations. Therefore, there is no justification for additional relaxation of diaphragm rigidity consideration.

Findings (based upon local geologic, topographic or climatic conditions):

The amendment is needed due to local geological conditions.

The San Francisco Bay area region is densely populated and/or located in an area of high seismic activities as indicated by United States Geological Survey and California Division of Mines and Geology. Recent earthquake activities, including the 1989 Loma Prieta earthquake, have indicated the lack of adequate design and detailing as a contributing factor to damages that reduced the protection of the life-safety of building occupants.

Recommendations:

Use as Amendment

Proposed by Code Interpretation Committee:

Date: March 1, 2002

Item Number: 11
Code Section: 1630.8.2
Proposed Amendment (strikeout/underline format):

- **1630.8.2.1 General.** Where any portion of the lateral-load-resisting system is discontinuous, such as for vertical irregularity Type 4 in Table 16-L or plan irregularity Type 4 in Table 16-M, ~~concrete, masonry, steel and wood elements~~ columns, beams, trusses or slabs supporting such discontinuous systems shall have the design strength to resist the combination loads resulting from the special seismic load combinations of Section 1612.4. *The Connections of such discontinued elements to the supporting members shall be adequate to transmit the forces for which the discontinuous elements were required to be designed.*

  EXCEPTIONS: 1. The quantity E_m in Section 1612.4 need not exceed the maximum force that can be transferred to the element by the lateral-force-resisting system.
  2. Concrete slabs supporting light-frame wood shear wall systems or light-frame steel and wood structural panel shear wall systems.

For Allowable Stress Design, the design strength may be determined using an allowable stress increase of 1.7 and a resistance factor, Φ, of 1.0. This increase shall not be combined with the one-third stress increase permitted by Section 1612.3, but may be combined with the duration of load increase permitted in Chapter 23, Division III.

Recommendation: Approve as modified

Reason for amendment:

The changes limits use of the special load combination to the primary elements of the structural frame system, thereby exempting miscellaneous components of the lateral-force resisting system (such as hold-downs) and foundations. This is consistent with intent of the Code and SEAOC Seismology Position.

The changes in italics were added by the Tri-Chapter code committee to ensure that connections of such elements to the supporting members are not designed for a load less that what the member above is designed for. For example in case of steel columns that are part of laetrile system, which are designed for the special load combination, it is prudent to ensure that their connections also have sufficient capacity to transmit the load to the supporting element.

Findings (based upon local geologic, topographic or climatic conditions):

The amendment is needed due to local geological conditions.

The San Francisco Bay area region is densely populated and/or located in an area of high seismic activities as indicated by United States Geological Survey and California Division of Mines and Geology. Recent earthquake activities, including the 1989 Loma Prieta earthquake, have indicated the lack of adequate design and detailing as a contributing factor to damages that reduced the protection of the life-safety of building occupants.

Recommendations:

Use as Amendment

Proposed by Code Interpretation Committee:

Date: March 1, 2002

Item Number: 12
Code Section: 1630.8.2
Proposed Amendment (strikeout/underline format):

1630.8.2.2 Detailing requirements in Seismic Zones 3 and 4. In Seismic Zones 3 and 4, elements supporting discontinuous systems shall meet the following detailing or member limitations:

1. Reinforced concrete or reinforced masonry elements designed primarily as axial-load members shall comply with Section 1921.4.4.5.

2. Reinforced concrete elements designed primarily as flexural members and supporting other than light-frame wood shear wall systems or light-frame steel and wood structural panel shear wall systems shall comply with Sections 1921.3.2 and 1921.3.3. Strength computations for portions of slabs designed as supporting elements shall include only those portions of the slab that comply with the requirements of these Sections.

3. Masonry elements designed primarily as axial-load carrying members shall comply with Sections 2106.1.12.4, Item 1, and 2108.2.6.2.6.

4. Masonry elements designed primarily as flexural members shall comply with Section 2108.2.6.2.5.

5. ~~Steel elements designed primarily as axial-load members shall comply with Sections 2213.5.2 and 2213.5.3.~~ Not Adopted.

6. Steel elements designed primarily as flexural members or trusses shall have bracing for both top and bottom beam flanges or chords at the location of the support of the discontinuous system and shall comply with the requirements of ~~Section 2213.7.1.3.~~ AISC-Seismic Part I, Section 9.4b.

Recommendation: Approve

Reason for amendment:

a. The provision is adopted in AISC-Seismic 97 Part I, Section 8.3 and applicable to all axial loaded members. Redundant.
b. Old section is no longer applicable. Replace with provision in the AISC-Seismic.

Findings (based upon local geologic, topographic or climatic conditions):

The amendment is needed due to local geological conditions.

The San Francisco Bay area region is densely populated and/or located in an area of high seismic activities as indicated by United States Geological Survey and California Division of Mines and Geology. Recent earthquake activities, including the 1989 Loma Prieta earthquake, have indicated the lack of adequate design and detailing as a contributing factor to damages that reduced the protection of the life-safety of building occupants.

Recommendations:

Use as Amendment

Proposed by Code Interpretation Committee:

Date: March 1, 2002

Item Number: 13
Code Section: 1633.2.4
Proposed Amendment (strikeout/underline format):

1633.2.4 Deformation compatibility. All structural framing elements and their connections, not required by design to be part of the lateral-force-resisting system, shall be designed and/or detailed to be adequate to maintain support of design dead plus live loads when subjected to the expected deformations caused by seismic forces. $P\Delta$ effects on such elements shall be considered. Expected deformations shall be determined as the greater of the Maximum Inelastic Response Displacement, ΔM , considering $P\Delta$ effects determined in accordance with Section 1630.9.2 or the deformation induced by a story drift of 0.0025 times the story height. When computing expected deformations, the stiffening effect of those elements not part of the lateral-force-resisting sys-tem shall be neglected.

For elements not part of the lateral-force-resisting system, the forces induced by the expected deformation may be considered as ultimate or factored forces. When computing the forces induced by expected deformations, the restraining effect of adjoining rigid structures and nonstructural elements shall be considered and a rational value of member and restraint stiffness shall be used. Inelastic deformations of members and connections <u>are permitted to occur</u> ~~may be considered in the evaluation~~, provided the assumed calculated capacities are consistent with member and connection design and detailing.

Recommendation: Approve

Reason for amendment:

The proposal replaces ambiguous language of "may be" with the more affirmative language of "are permitted to" which clarifies the intent and eliminates confusion in enforcing the provision.

Findings (based upon local geologic, topographic or climatic conditions):

The amendment is needed due to local geological conditions.

The San Francisco Bay area region is densely populated and/or located in an area of high seismic activities as indicated by United States Geological Survey and California Division of Mines and Geology. Recent earthquake activities, including the 1989 Loma Prieta earthquake, have indicated the lack of adequate design and detailing as a contributing factor to damages that reduced the protection of the life-safety of building occupants.

Recommendations:

Use as Amendment

Proposed by Code Interpretation Committee:

Date: March 1, 2002

Item Number: 14
Code Section: 1915.2.2
Proposed Amendment (strikeout/underline format):

1915.2.2 Base area of footing or number and arrangement of piles shall be determined from the external forces and moments (transmitted by footing to soil or piles) and permissible soil pressure or permissible pile capacity selected through principles of soil mechanics. ~~*External forces and moments are those resulting from unfactored loads (D, L, W and E) specified in Chapter 16.*~~ External forces and moments are those resulting from the load combinations of Section 1612.3.

Recommendation: Approve

Reason for amendment:

The proposal corrects the existing code language for the design of footings for ASD criteria. The current language specifies unfactored loads, whereas, in ASD design there are some load factors that need to be considered.

Findings (based upon local geologic, topographic or climatic conditions):

The amendment is needed due to local geological conditions.

The San Francisco Bay area region is densely populated and/or located in an area of high seismic activities as indicated by United States Geological Survey and California Division of Mines and Geology. Recent earthquake activities, including the 1989 Loma Prieta earthquake, have indicated the lack of adequate design and detailing as a contributing factor to damages that reduced the protection of the life-safety of building occupants.

Recommendations:

Use as Amendment

Proposed by Code Interpretation Committee:

Date: March 1, 2002

Item Number: 15
Code Section: 1630.10.2
Proposed Amendment (strikeout/underline format):

1630.10.2 Calculated. Calculated story drift using Δ_M shall not exceed 0.025 times the story height for structures having a fundamental period of less than 0.5~~7~~ second. For structures having a fundamental period of 0.5~~7~~ second or greater, the calculated story drift shall not exceed $0.020/T^{1/3}$ times the story height.

(Note: Exceptions to remain unchanged)

1630.10.3 Limitations. The design lateral forces used to determine the calculated drift may disregard the limitations of Formula (30-6) *and (30-7) (Errata Mar. 2001)* and may be based on the period determined from Formula (30-10) neglecting the 30 or 40 percent limitations of Section 1630.2.2, Item 2.

(Note: 1630.10.3 shown for information only with no change.)

Recommendation: Approve

Reason for amendment:

The proposal corrects a much significant deficiency in the 97 UBC, which eliminated any minimum base shear from consideration when checking for building drift.

After engineers began using the '97 UBC they found problems with applying (30-7) for the drift calculations. (30-7) applies only to Zone 4 and was added after the Northridge Earthquake to account for near fault pulses. An erratum to '97 UBC Section 1630.10.3 was issued in March 2001, 3 years following publication, that deleted (30-7) from being applied to drift calculations. However, SEAOC Seismology Committee found that the erratum actually made the drift limit to be less stringent and would allow more slender and flexible buildings than were allowed under the '94 UBC.

The proposed modification was recommended by SEAOC Seismology Committee. It effectively makes the descending branch vary with $1/T^{2/3}$ for drift coordination purposes and make the drift limitations very similar to those of the '94 UBC.

The change from 0.7 seconds to 0.5 seconds in the proposal is needed to avoid a step function in the drift limit. If 0.7 second were retained, the drift limit at T just below 0.7 seconds would have been different from the drift limit just above 0.7 seconds. With the switch to 0.5 seconds, the drift limit just below T=0.5 seconds is the same as the drift limit just above T=0.5 seconds

Findings (based upon local geologic, topographic or climatic conditions):

The amendment is needed due to local geological conditions.

The San Francisco Bay area region is densely populated and/or located in an area of high seismic activities as indicated by United States Geological Survey and California Division of Mines and Geology. Recent earthquake activities, including the 1989 Loma Prieta earthquake, have indicated the lack of adequate design and detailing as a contributing factor to damages that reduced the protection of the life-safety of building occupants.

Recommendations:

Use as Amendment

Proposed by Code Interpretation Committee:

Date: March 1, 2002

Item Number: 16
Code Section: 2316
Proposed Amendment (strikeout/underline format):

Division III-DESIGN SPECIFICATIONS FOR ALLOWABLE STRESS DESIGN OF WOOD BUILDINGS

Part I-ALLOWABLE STRESS DESIGN OF WOOD

This standard, with certain exceptions, is the ANSI/NFoPA ~~NDS-91~~ NDS-97 National Design Specification for Wood Construction of the American Forest and Paper Association, ~~Revised 1991~~ 1997 Edition, and the Supplement to the ~~1991~~ 1997 Edition, National Design Specification, adopted by reference.

The National Design Specification for Wood Construction, ~~Revised 1991~~ 1997 Edition, and supplement are available from the American Forest and Paper Association, 1111 19th Street, NW, Eighth Floor, Washington, DC, 20036.

SECTION 2316 - DESIGN SPECIFICATIONS 2316.1 Adoption and Scope. The National Design Specification for Wood Construction, ~~Revised 1991~~ 1997 Edition (NDS), which is hereby adopted as a part of this code, shall apply to the design and…….

Also:

2316.2 Amendments.

……determined in accordance with these test procedures shall be multiplied by all applicable adjustment factors (see Table 7.3.1) to obtain allowable design values.

~~27. NDS Supplement Table 5A. Add combinations and design values as follows:~~

(delete the following table)

Recommendation: Approve

Reason for amendment:

The 1991 NDS is an outdated specification, which is more than 10 years old. Since the adoption of 97 UBC the NDS has published the 1997 specifications which incorporates many of them items that were added since publication of 1991 NDS and it is also in a more user friendly format.

Findings (based upon local geologic, topographic or climatic conditions):

The amendment is needed due to local geological conditions.

The San Francisco Bay area region is densely populated and/or located in an area of high seismic activities as indicated by United States Geological Survey and California Division of Mines and Geology. Recent earthquake activities, including the 1989 Loma Prieta earthquake, have indicated the lack of adequate design and detailing as a contributing factor to damages that reduced the protection of the life-safety of building occupants.

Recommendations:

Use as Amendment

TRICHAPTER UNIFORM CODES PROGRAM
2002 CBC AMENDEMENTS AND INTERPRETATION

Proposed by Code Interpretation Committee:

Date: April 9, 2002

Item Number: 17
Code Section: 2320.11.3
Proposed Amendment (strikeout/underline format):

SECTION 2320.11.3: CONVENTIONAL CONSTRUCTION PROVISIONS (BRACING)

1997 UBC SECTION 2320.11.3, ITEMS 5 & 7 ARE AMENDED AS FOLLOWS (NEW LANGUAGE IS UNDERLINED):

Delete 1997 UBC Section 2320.11.3, Item 5 which allows the use of gypsum board for bracing

Amend 1997 UBC Section 2320.11.3, Item 7 as follows:

Portland cement plaster on studs spaced 16 inches on center installed in accordance with Table No. 25-1. Limited to one story structure of R-3 and U-1 occupancies.

Recommendation: Approve

Reason for amendment:

GYPSUM WALLBOARD AND EXTERIOR PORTLAND CEMENT PLASTER HAVE PERFORMED POORLY DURING RECENT CALIFORNIA SEISMIC EVENTS. THE SHEAR VALUES OF GYPSUM WALLBOARD AND PORTLAND CEMENT STUCCO CONTAINED IN THE CODE ARE BASED ON MONO-DIRECTIONAL TESTING. IT IS APPROPRIATE TO LIMIT THE USE OF THESE PRODUCTS UNTIL CYCLIC LOAD TESTING ARE PERFORMED AND EVALUATED.

Findings (based upon local geologic, topographic or climatic conditions):

The amendment is needed due to local geological conditions.

The San Francisco Bay area region is densely populated and/or located in an area of high seismic activities as indicated by United States Geological Survey and California Division of Mine and Geology. Recent earthquake activities, including the 1989 Loma Prieta earthquake, have indicated the lack of adequate design and detailing as a contributing factor to damages that reduced the protection of the life-safety of building occupants.

Recommendations:

A. Use as Interpretation……□……
B. Use as Amendment……..□……

TRICHAPTER UNIFORM CODES PROGRAM
2002 CBC AMENDEMENTS AND INTERPRETATION

Proposed by Code Interpretation Committee:

Date: April 9, 2002

Item Number: 18
Code Section: 213
Proposed Amendment (strikeout/underline format):

SECTION 213: DEFINITION

213 Light-Frame Construction is a type of construction whose vertical and horizontal structural elements are primarily framed by a system of repetitive wood or light gauge steel framing members, and which does not use structural concrete as floor or roof diaphragm.

Recommendation: Approve

Reason for amendment:

THE 1997 UBC, ON SEVERAL OCCASIONS, REFERS TO "LIGHT-FRAME" CONSTRUCTION. HOWEVER, CURRENTLY THERE IS NO DEFINITION FOR THE TERM. THE PROPOSAL INSERTS NEW LANGUAGE, SIMILAR TO THE PROVIDED IN IBC, FOR ADDITIONAL CLARIFICATION.

Findings (based upon local geologic, topographic or climatic conditions):

The amendment is needed due to local geological conditions.

The San Francisco Bay area region is densely populated and/or located in an area of high seismic activities as indicated by United States Geological Survey and California Division of Mine and Geology. Recent earthquake activities, including the 1989 Loma Prieta earthquake, have indicated the lack of adequate design and detailing as a contributing factor to damages that reduced the protection of the life-safety of building occupants.

Recommendations:

C. Use as Interpretation……□……
D. Use as Amendment……..□……